



## Evaluation of Adnexal Masses with Gray Scale Ultrasonography and Color Doppler Flow Imaging in the First Trimester of Pregnancy

Midrarullah Khan<sup>1,2</sup>, Muhammad Zubair<sup>2</sup>

<sup>1</sup> Department of Radiology, Khyber Teaching Hospital Peshawar, Pakistan

<sup>2</sup> University Institute of Radiological Sciences and Medical Imaging Technologies, Faculty of Allied Health Sciences, University of Lahore, Pakistan

Corresponding Author: Muhammad Zubair

Email: [zubairm955@gmail.com](mailto:zubairm955@gmail.com)



### Article Info

#### Article history:

Received 27 May 2020

Received in revised form 06 June 2020

Accepted 10 June 2020

#### Keywords:

Gray-Scale  
Doppler Ultrasound  
Pregnancy  
Adnexal Masses

### Abstract

Sonography is common use in early pregnancy has led to the exposure of incidental adnexal masses more often. Assessment of grayscale and color Doppler sonography outcomes is as precise when based on static images. To determine the evaluation of adnexal masses with grayscale ultrasonography and color Doppler flow imaging in first trimester of pregnancy. This Cross Sectional study was conducted at the Department of Radiology, Jinnah Hospital, Lahore, Pakistan. The study was conducted from July to Dec 2019. The patients were selected by nonprobability convenience sampling. All pregnant patients were undergoing abdominal ultrasonography to detect the adnexal masses. The data was collected by the questionnaire. Overall 68 individuals involved in this study out of which 29(96.7%) are benign diseases on the left side of patients and malignant are only 1(3.3%). Patients having benign diseases of right-sided are 33(86.8%) and malignant are 5(13.2%). Benign diseases are 62(91.2%) out of which 43 patients had cystic, 15 are mixed and 4 are solid components. Malignant diseases are found only 6 patients out of which 3 are mixed and 3 are solid components. Majority of the adnexal masses identified in pregnancy is benign and will resolve suddenly. Doppler sonography has severe limitations in the differentiation of benign from malignant adnexal disease on the basis of low-impedance flow.

### Introduction

The prevalence of adnexal masses detected in the first trimester of pregnancy based on masses, natural history and on the observation of the masses (Agarwal et al, 2003). Adnexal masses referred to lump in the tissue of the adnexa of uterus structures, it is faithfully associated basically and functionally to the uterus such as the ovaries, fallopian tubes, or any of the surrounding connective tissue (Whiteside & Keup, 2009). The testified occurrence of adnexal masses in the first trimester of pregnancy ranges from 0.2% to 2.9% (Czekierdowski et al, 2001). It originates in the ovaries, fallopian tubes, or adjacent tissue. They might present as various histological sorts and their clinical worth may vary largely depending mostly on tumor size, clinical appearance, and risk of malignancy. The pregnancy is not only exception because it can be diagnose in women of any age (Bignardi & Condous, 2009). Cysts might be doesn't shows any symptoms and might be they found coincidentally or till their size increases the

abdominal size. Discomfort is due to rupture, venous congestion, hemorrhage into the cyst, infection or torsion might be sudden onset (DePriest & DeSimone, 2003).

They are classified on sonography by their size, number of cysts, its echotexture and solid or cystic-solid. These masses are characterized by sonography into 4 groups: simple cysts smaller than 05 cm in mean diameter, simple cysts 05 cm or greater in mean diameter, complex or multicystic. At initial stage the cure rates for the disease are approximately 80 to 90% but existence is only 50% (McCarthy, 2007). In 1<sup>st</sup> trimester, obstetrical sonography examination of adnexa common finding is sonolucent masses and corpus luteum cysts are most common. Growth in the size of these lesions as pregnancy developments supports the diagnosis of a corpus luteum cyst, during 1<sup>st</sup> trimester of pregnancy natural of cysts are enlarge (Alfuhaid et al, 2003).

Usually simple cyst characterize approachable and its size 1cm to 3cm in range, such as corpus luteal cyst because they cause no risk in pregnancy. To maintain the pregnancy theca luteal cyst, corpus luteum and hemorrhagic are initially required. In 1<sup>st</sup> trimester sonography, the majority of simple cyst will identify prior to 8 weeks (Yacobozzi et al, 2012). On examination, if the adnexal mass is palpated then sonography favored for the confirmation because it has ability to distinguish morphology. This will initially allow stratification of risk without cooperating maternal and fetal safety (Giuntoli et al, 2006).

In most cases, knowledge of the clinical appearance and ultrasonographic outcomes allows for the correct diagnosis. So, it is important for the obstetrician must have expert in the diagnosis and management of masses in pregnancy (Crispens, 2003). These adnexal masses may results in serious complications and interfere with normal delivery therefore, early diagnosis and management of adnexal masses are necessary.

## Methods

We reviewed all obstetric ultrasound examinations in which an adnexal mass or cyst was identified from July to Dec 2019, at the Department of Radiology, Jinnah Hospital, Lahore, Pakistan. Adnexal masses were classified sonographically by size, number of cysts (unilocular or multilocular), echotexture (cystic, solid, or cystic-solid), laterality (unilateral or bilateral), and anatomic site if known (ovarian, tubal, uterine, or nongynecologic). Masses were categorized sonographically into four groups: simple cysts less than 5 cm in mean diameter, simple cysts 5 cm or more in mean diameter, multicystic masses (masses containing more than one simple cyst), or complex masses. Simple cysts were defined as cysts that were smooth-walled and devoid of internal echoes.

Complex masses were defined as either solid masses or masses not meeting the criteria for simple cysts. All simple cysts with mean diameters greater than 1 cm, all multicystic masses, and all complex masses regardless of size were included for analysis. Data is evaluated and analyzed with SPSS version 24, Microsoft excel 2016. The quantitative data (Age, gender, blood pressure) presented in the form of descriptive statistics, mean  $\pm$  S.D and qualitative data is presented by percentage, frequency and bar charts, or pie charts. Collected data stored in Microsoft office.

## Results and Discussion

A total of 68 patients were enrolled in this study, minimum age was 18 years and maximum 39 years of woman. Out of which 62(91.2%) are benign out of which 43 patients had cystic, 15 are mixed and 4 are solid components. Malignant diseases are found only 6 patients out of which 3 are mixed and 3 are solid components in table 1.

Table 1: Type of mass

Type of mass	USG criteria		Total
	Benign	Malignant	
Cystic	43 100.0%	0 0.0%	43 100.0%
Mixed	15 83.3%	3 16.7%	18 100.0%
Solid	4 57.1%	3 42.9%	7 100.0%
Total	62 91.2%	6 8.8%	68 100.0%

Table 2 shows that, overall of 68 patients involved in our study out of which 29(96.7%) are benign diseases in left side of patients and malignant are only 1(3.3%). Patients having benign diseases of right sided are 33(86.8%) and malignant are 5(13.2%).

Table 2: Side of adnexal mass

Side of adnexal mass	USG criteria		Total
	Benign	Malignant	
Left	29 96.7%	1 3.3%	30 100.0 %
Right	33 86.8%	5 13.2%	38 100.0 %
Total	62 91.2%	6 8.8%	68 100.0 %

Ultrasound is the preferred method of confirmation of diagnosis because of its ability to differentiate morphology. This will ultimately allow stratification of risk without compromising maternal and fetal safety. Most adnexal masses detected on sonography during pregnancy are diagnosed incidentally during a routine screening ultrasound in the first trimester. Simple cysts or hemorrhagic, corpus luteum cysts. Simple cysts are unilocular, anechoic and have a smooth, thin wall. Corpus luteum cysts enlarge during the first trimester, start regressing by the 12<sup>th</sup> week of gestation, and disappear later in the pregnancy.

Doppler sonography has severe limitations in the differentiation of benign from malignant adnexal disease on the basis of low-impedance flow. As expected, we found the rate of adnexal masses in pregnancy to be higher in a population undergoing obstetric sonography than in a population who presented with pain or a palpable adnexal mass.

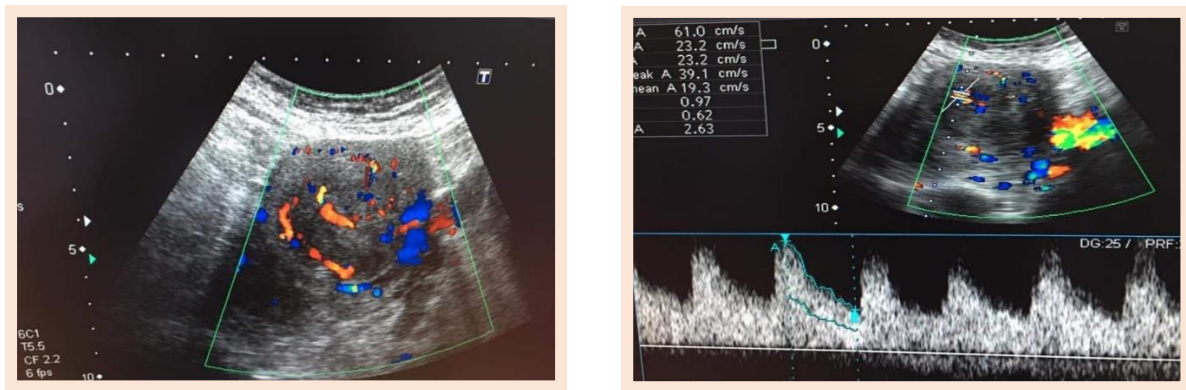


Figure 1. An anterior wall fibroid of uterus in a patient of 36 years. On Doppler the mass had a rich blood supply. The resistivity and pulsatility index of vessels from Centre and peripheral vessels revealed a borderline flow for cancer.

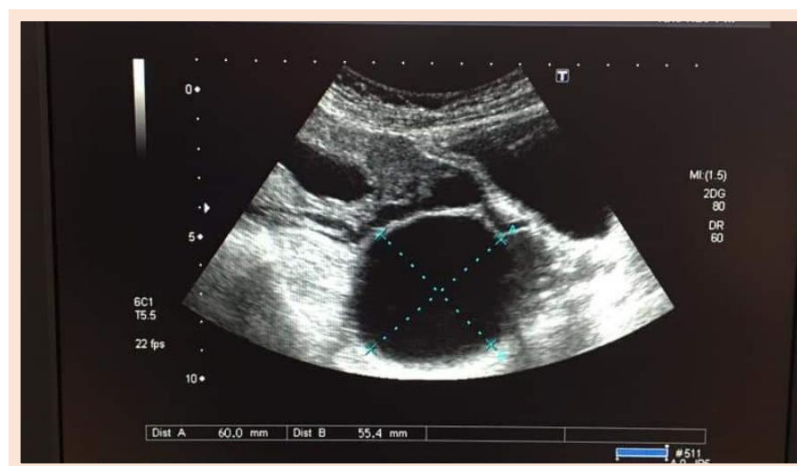


Figure 2. Pregnancy with an ovarian cyst measuring 6×5.4 cms.

The study was performed by Hisanori Minakami et al 2000, on the topic of retrospective survey of clinical, pathologic and prognostic features of adnexal masses operated on during pregnancy. The aims of his study were evaluate retrospective data concerning patients with adnexal masses that were managed surgically during pregnancy and their effect on fetal outcome. The outcomes shows, In the past 19 years at our hospital a total of 69 Japanese women aged  $28.5 \pm 3.4$  years (including 2 women with twin pregnancies) were diagnosed with adnexal masses that required surgery. The masses ( $10.2 \pm 4.5$  cm in the largest diameter) were removed at  $13.9 \pm 3.7$  weeks of gestation. The pathologic features of the 69 lesions were as follows: 33 mature cystic teratomas, 13 functional cysts, 8 mucinous cystadenomas, 6 endometriotic cysts, 4 paraovarian cysts, 3 serous cystadenomas, and 2 malignant neoplasms. Of the 60 patients for whom the outcome of pregnancy was available, 7 (12%) gave birth before 37 weeks of gestation, while 2 (3.3%) experienced spontaneous abortions. There were 3 perinatal deaths among the 60 infants. Two of these 3 infants died due to major anomalies. At the end they concluded that, Although larger studies are required for confirmation, our results suggest that an adnexal mass might be associated with an adverse fetal outcome. Surgical intervention at < 24 weeks of gestation *per se* might not have been related to the adverse outcomes (Usui et al, 2000). In a study done in 2015 by Nazer et al., there 7,785,583 deliveries were recorded between 2003 and 2011, of which 19,591 were diagnosed with ovarian masses during delivery, representing 0.25% of all deliveries, and 1:200 of these were malignant. The overall malignancy rate was 0.12/10,000 deliveries. Apart from the increased rate of cesarean sections, odds ratio (OR) 5.92 (95% confidence interval [CI] 4.12–8.40), and the risk of thrombosis, OR

5.52 (95% CI 1.96–15.53), there was no significant increase in maternal morbidity or mortality. However, prematurity, OR 2.24 (95% CI 1.48–3.40), was a significant newborn risk in women with malignant ovarian tumors. Newborns of women with ovarian mass had comparable risks of intrauterine growth restriction, preterm rupture of membranes, and intrauterine death (Nazer et al, 2015). In another study, 16 pregnant patients underwent surgery to remove an adnexal mass. All but one had abdominal-pelvic pain. The mean gestational age at the time of surgery was  $15 \pm 6$  weeks versus  $13 \pm 4$  weeks in the laparoscopic and laparotomy groups, respectively ( $P = \text{NS}$ ). All patients undergoing laparoscopy remained in the hospital for 1 day compared with a mean of  $4.4 \pm 1.1$  days in the laparotomy group ( $P < 0.0001$ ). Pregnancy outcomes were similar and uniformly good (Carter & Soper, 2004). According to our study 29(96.7%) are benign diseases in left side of patients and malignant are only 1(3.3%). Patients having benign diseases of right sided are 33(86.8%) and malignant are 5(13.2%).

## Conclusion

Mostly of the adnexal masses were identified in pregnancy are benign and will determination spontaneously. Most adnexal masses detected on sonography during pregnancy were identified incidentally during a routine screening sonography in the 1<sup>st</sup> trimester. Color Doppler ultrasonography has severe limits in the difference of benign from malignant adnexal disease on the basis of low impedance flow.

## References

- Agarwal, N., Kriplani, A., Bhatla, N., & Gupta, A. (2003). Management and outcome of pregnancies complicated with adnexal masses. *Archives of gynecology and obstetrics*, 267(3), 148-152.
- Alfuhaid, T. R., Rosen, B. P., & Wilson, S. R. (2003). Low-malignant-potential tumor of the ovary: sonographic features with clinicopathologic correlation in 41 patients. *Ultrasound quarterly*, 19(1), 13-26.
- Bignardi, T., & Condous, G. (2009). The management of ovarian pathology in pregnancy. *Best Practice & Research Clinical Obstetrics & Gynaecology*, 23(4), 539-548.
- Carter, J. F., & Soper, D. E. (2004). Operative laparoscopy in pregnancy. *JSLS: Journal of the Society of Laparoendoscopic Surgeons*, 8(1), 57.
- Crispens, M. A. (2003). Borderline ovarian tumours: a review of the recent literature. *Current Opinion in Obstetrics and Gynecology*, 15(1), 39-43.
- Czekierdowski, A., Bednarek, W., Rogowska, W., & Kotarski, J. (2001). Difficulties in differential diagnosis of adnexal masses during pregnancy: the role of greyscale and color Doppler sonography. *Ginekologia polska*, 72(12A), 1281-1286.
- DePriest, P. D., & DeSimone, C. P. (2003). Ultrasound screening for the early detection of ovarian cancer. *Journal of clinical oncology: official journal of the American Society of Clinical Oncology*, 21(10 Suppl), 194s-199s.
- Giuntoli, R. L. I. I., Vang, R. S., & Bristow, R. E. (2006). Evaluation and management of adnexal masses during pregnancy. *Clinical obstetrics and gynecology*, 49(3), 492-505.
- McCarthy, A. (2007). Miscellaneous medical disorders Dewhurst's textbook of Obstetrics and gynaecology.
- Nazer, A., Czuzoj-Shulman, N., Oddy, L., & Abenhaim, H. A. (2015). Incidence of maternal and neonatal outcomes in pregnancies complicated by ovarian masses. *Archives of gynecology and obstetrics*, 292(5), 1069-1074.

- Usui, R., Minakami, H., Kosuge, S., Iwasaki, R., Ohwada, M., & Sato, I. (2000). A retrospective survey of clinical, pathologic, and prognostic features of adnexal masses operated on during pregnancy. *Journal of Obstetrics and Gynaecology Research*, 26(2), 89-93.
- Whiteside, J. L., & Keup, H. L. (2009). Laparoscopic management of the ovarian mass: a practical approach. *Clinical obstetrics and gynecology*, 52(3), 327-334.
- Yacobozzi, M., Nguyen, D., & Rakita, D. (2012). Adnexal masses in pregnancy. In *Seminars in Ultrasound, CT and MRI* (Vol. 33, No. 1, pp. 55-64). WB Saunders.